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PRELIMINARY REPORT ON THE SOUTHERN PINE BEETLE  
INFESTATION IN EASTERN TEXAS  
1950

RECEIVED  
OCT 11 1950  
TEXAS FOREST SERVICE  
THE TEXAS A. & M. COLLEGE SYSTEM

Station Leader - Charles F. Speers

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MAY 26 1958

Preliminary work:

Texas Forest Service

The Gulfport laboratory of the Division of Forest Insect Investigations received information that an infestation of the southern pine beetle was in progress in eastern Texas the latter part of July 1950. Mr. R. Morris was assigned to investigate the report and determine if some of the newer insecticides were suitable, either as cheaper or more effective controls for this pest. Morris reported his findings in a report dated August 10.

At the request of private timber owners a further survey of this infestation was requested in order to ascertain various aspects of the problem which were not covered in Morris's preliminary report. Upon my arrival in Texas I was informed that the Texas Forest Service had already assigned a plane to plot the infestation. The plane was assigned to fire protection and couldn't be spared for too long a period. The pilot had, therefore, only attempted to plot the perimeter of the areas of heavier infestation. Maps of his determinations were prepared by the Texas Forest Service and distributed to all timber owners in the area to alert them to conditions then existing. Copies of Morris's report had also been prepared by the Southern Forest Experiment Station and distributed in order to keep owners informed of current developments. In general, this preliminary work and publicity of the situation by Texas Forest Service and the Southern Forest Experiment Station was excellent.

Area of Infestation:

The infestation is active in southeastern Texas in the relatively inaccessible flatwoods area called the "Big Thicket." This area is located about mid-way between Huntsville and Woodville on route 190 and Beaumont and Houston on route 90. In general, the area is about 50 feet above sea level, received 60" of rainfall per year and has little cold weather during any portion of the year. The stands are composed of bottomland hardwoods, mixtures of hardwood and pine and pure pine. Loblolly pine is the principle coniferous species and often attains 18" DBH in 30 years. The stands which are now being cut to a 12" limit generally average about 8,000 board feet per acre. Many trees observed had put on one-half inch of ring growth or more. Most of the stands attacked ranged from 4" - 18" DBH.

Oil and gas lines traversed the area and these are passable by jeep and occasionally with passenger cars. The Missouri Pacific railroad passes east and west through the center of the largest infested area and hard surface roads surround most of the infested areas. Several large lumber companies and pulpwood companies have holdings in the area.

This area suffered from drought during the years of 1947 and 1948 and many trees died from drought conditions in those years. In 1949 normal rainfall was resumed, which was clearly indicated in the increased ring growth in the trees. The year 1950 was considered normal up until June when a rather dry spell occurred. However, a heavy rain occurred the first week of September. When I left the area the water was standing on the surface of the ground from 3" - 8" deep throughout most of the pine stands.

A representative of the Texas Forest Service has estimated that about 32,000,000 board feet of pine has already been killed in Hardin and Liberty County. These counties have good stands of pine with an estimated volume of sawtimber of over 1.5 billion board feet by the International Scale. Of this total, 95,000 acres with a volume of 255,000,000 board feet are heavily infested and 485,000 acres with a volume of 1,298,000,000 board feet are lightly infested.

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The immediate threat is to the remaining pine in these areas. At an estimated \$30 per thousand board feet the 32,000,000 board feet already killed had a stumpage value before death of \$960,000. Some of this will be salvaged, but at a lower price by about \$10 per thousand. Immediately threatened are trees containing about 1.5 billion board feet of timber valued at \$45,000,000, exclusive of pulpwood below nine inches DBH.

It must be pointed out, however, that there is much more than just stumpage value involved. If it were manufactured into lumber alone it would represent a minimum value in salaries, wages, etc. of over \$100 per thousand board feet. If these values were considered the values threatened at the present time, it would be over \$150,000,000.

Other factors which must be considered are the probability of forest fires being started in the killed areas where the dried fuel will increase the intensity and rapidity of spread. The tangle of down material will increase the difficulty of control resulting in large areas burned. In the preliminary checks made it was ascertained that if the outbreak follows the present pattern that an equal volume of timber will be killed in 1951 as was killed in 1950 unless controlled before next summer. Natural factors have been operating during the past two seasons and the ratio of build-up has been slow when the ratio of build-up of this insect under favorable conditions is considered. Under the most favorable conditions this insect is capable of increasing at the ratio of 10.1 during each generation. This, in terms of trees killed, represents 100,000 trees killed at the end of a season for each one infested in the spring if five generations were produced.

#### Airplane view of the area:

A flight of an hour was made in a Texas Forest Service low wing monoplane at 1600 feet elevation. Visability was about ten miles and considered good. The area was seen to be spotted with kills varying from single trees to areas up to two hundred acres or more. Most of the kills were one or two acres in extent, but two or three were 30 - 50 acres and two were 100 acres or more. There were possibly 90 - 100 separate areas of attack in the largest area of infestation north of Devers. The most prominent trees observed were trees in the "red straw" stage which had been killed sometime during the past spring or summer and they appeared as if a fire had passed over the area. Trees in the fading stage did not appear in large numbers and green attacks could not be observed at all. Small areas of the previous years kill were observed throughout the area with the largest old kill apparently located in the Honey Island area. Although not denoted on the infestation areas outlined by the Texas Forest Service, there were noted both individual kills and small group kills of 1 - 10 trees scattered throughout the area north of Devers all of the way from the Devers to the Honey Island infestation. The Cleveland area was not observed, but a representative of the Texas Forest Service stated that the attacks in that area were not in large groups but were mainly composed of small kills.

#### Difficulty of obtaining control of the beetle:

In order to obtain effective control of the beetle, most of the areas of infestation must be eliminated. Several factors may cause this problem to be more difficult than at first appears. Some of these factors are: (1) Inaccessibility, (2) Possible short logging periods at least desirable time of year (3) Difficulty of locating infested trees, (4) Cost of treatment, (5) Holding of land for oil rather than timber values, (6) Small owners and absentee owners.

The area is relatively inaccessible for truck logging except during the short summer period mid June to mid September. Logging during other portions of the year require arches and trams, since the area is too wet for trucks. The infested trees are hard to detect, since to few no pitch tubes are evident and fading of the crown often does not occur until after the brood has matured or left the tree. Operators may not want to pay the cost of spray materials



and the cost of locating, cutting, and application of these spray materials. Holders of land who are interested in oil rights, small owners and absentee owners who may see their lands only once in five years would not be expected to be interested in control of insects in timber in which they have little interest.

Progress in controlling the infestation:

The Edens-Birch Lumber Company who have cutting rights on the Grayburg Lumber Company lands appear to be doing the most work in controlling the infestation in the area north of Devers. They have one small mill located in the center of a 100 acre kill and are cutting about 8,000 board feet per day. They have also graded a road in from south of Daisetta and are hauling about 50,000 board feet daily to their mills at Cleveland and Corrigan. In both cases they have been burning the slabs as they came off of the saws. Unfortunately, they have not concentrated on cutting the brood trees from the various areas of infestation, but have continued from spot to spot cutting the entire area as a salvage operation in combination with control. This same company has also regraded an old tram road running north from Devers and they are now in the process of putting in rails and ties. They hope to be able to log all winter with arches and a tramway and expect to cut about 15,000,000 off of the lands in this area during the coming winter. Mr. C. Nelson, a representative of the Edens-Birch Lumber Company has located at least 28 separate infestations on the lands which he is operating. Most, if not all of the infestations on these lands should be eliminated or greatly reduced before next spring.

Some of the natural control factors operating in the area are clerids and borers. In one tree examined carefully from four to six clerid larvae were found per square foot of bark surface. However, the brood of southern pine beetle had entered the outer bark and pupated and large numbers of these were present, indicating that the clerids had done little to control the infestation. Few clerid adults were observed in the several days spent in the area. Borers were abundant and no doubt in their feeding they consumed numerous bark beetle larvae. Few woodpeckers were seen or heard in the area and their work was not very evident or abundant.

Ground checks of the infestation:

Several days were spent ground checking the areas in order to determine the status of the infestation. The following checks were made.

Cleveland area:

Every road was covered denoted on the Texas Forest Service infestation map, but no 1950 attacks of any size were located. The area in general was quite accessible, cut over, and contained fair amounts of hardwoods. After the area was checked we met Mr. Ham of the Bruce Lumber Company who stated that the area on the map was located too far north and that the area of infestation was further southeast and apparently on some of the lands of the Kirby Lumber Company. We were not able to check the revised location.

Batson area:

This land was also owned by the Kirby Lumber Company. We drove into this area on a road leading to a new oil well site and climbed a 50 foot oil well derrick, but were unable to locate or spot any large areas of infestation.

Honey Island area:

This land may also be owned by the Kirby Lumber Company. We drove in on all access roads and along the pipeline, but were unable to locate the areas of infestation, although I had previously flown over this area in the plane. Apparently the above three areas were plotted on the map of such a small scale that the areas of infestation could not be easily located upon the ground.

Devers area:

Areas of infestation were relatively easy to locate in this area. Examination of these areas demonstrated that the condition of the infestation varied a great deal. In most cases few, to practically no pitch tubes were present and new adults were sometimes found to be emerging from trees, while the crown of the tree was still green in spite of the fact that the cambial area was brown and killed completely around the tree. Attacks of D. frontalis were generally confined to the area from about breast high to the lower portions of the crown. Ips sp. generally filled in with attacks in the basal five feet of the tree and above the attacks of frontalis in the crown. Borers and ambrosia beetles soon followed and were present in large numbers. Practically no turpentine barkbeetles were observed during any of the inspection. One of the best indications that trees were attacked by frontalis was the presence of sawdust at the base of the tree caused by the combination of frontalis, borer, and ambrosia attack. The only means by which attacked trees could be detected was by a careful examination of foliage for discoloration, search of the bole of the tree for pitch tubes or sawdust, tapping the tree with an axe to dislodge loose boring dust and then checking the base of the tree for sawdust caused by the attack of the barkbeetle, borers and ambrosia beetles since attacked trees would have various combinations of these signs of attack.

One day after the heavy rain in September the inner bark of attacked trees was examined and it was found that in trees with fading straw that water could be squeezed out of the cambium with but slight pressure of the fingers. However, the moisture had not penetrated the outer corky layers of bark and the pupae were unaffected. In green trees the inner bark was still tight and the moisture content of the cambium had not appreciably raised and larvae feeding in this region were unaffected.

Counts were made of trees attacked in infested areas in the Devers area to determine the trend of the infestation. The following tree counts were made:

Along the newly graded road south of Diasetta:-

Attack #1 covered 0.8 acre contained	1948 - 2 attacks
	1949 - 52 attacks
	1950 - 15 red straw
	1950 - 2 yellow straw
Attack #2 (small group)	1948 - 5 attacks
	1949 - none
	1950 - none
Attack #3 (two trees)	1949 - 1 attack
	1950 - 1 attack
Attack #4 covering 0.8 acre contained	1948 - None
	1949 - 38
	1950 - 14 red straw
	1950 - 3 yellow straw
Attack #5 (small group)	1948 - 7 attacks
	1949 - None
	1950 - None
Attack #6 (small group)	1949 - 3 attacks
	1950 - 1 red straw
Attack #7 (small group)	1949 - 6 attacks
	1950 - None
Attack #8 covering 40 acres.	This area was already cut over by Edens-Birch Lumber Company and the trend of the attack was not determined.

Along the Missouri Pacific Railroad east of Hull, Texas:-

Attack #9 and #10 separated by one chain and each about an acre in area.

Attack #9	1948 - 30 trees attack
	1949 - 45 attacks
	1950 - 10 red straw



## Attack #10

1949 - 2 attacks  
 1950 - 48 red straw  
 1950 - 10 yellow straw  
 1950 - 1 green straw

## Attack #1 covering about 6 acres

1948 - 11 attacks  
 1949 - 63 attacks  
 1950 - 75 red straw  
 1950 - 21 yellow straw  
 1950 - 1 green straw

## Attack #12 (small group)

1948 - 22 attacks  
 1949 - None  
 1950 - None

From the information gathered so far it appears that there has been a slight build-up over last year, but this increase as yet does not appear to be very great. Practically all of the trees which now contain brood are either on the southern or western portions of attacked areas and in no case were new attacks found completely around the perimeter of killed areas. In general, it appears that the attacks are following an arithmetic rather than a geometric progression this year and thus an area with 10 attacks early in the season might still have 10 trees infested, but the work of the brood in these trees would be represented by 50 red straw trees caused by the beetle passing through several generations. In general, the ratio of trees presently infested to trees killed and now in the red straw stage is about 1.5.

General recommendations for procedure:

(1) Three areas of infestation (Cleveland, Batson and Honey Island) appear to belong to the Kirby Lumber Company. These lands were photographed last year for Pomeroy and McGowin of Wilmar, Arkansas. Kirby should have a set of prints at their Houston office and if they are interested in control they might possibly pick out their infested areas from these photographs. Their photographs might also be used for comparison with new photographs to determine the progress of the infestation if the scale of their photograph are large enough.

(2) That areas of infestation be plotted by a reconnaissance flight over the areas of infestation on aerial photographs of USGS sheets previously made and later ground checked for accuracy. If this method of locating the infestations is feasible the areas of infestation would not have to be photographed thus cutting the cost of photographing the area by possibly 75 per cent, as well as the time element.

(3) That an aerial photographic survey be made of all attacked areas if the reconnaissance survey mentioned in the previous recommendation is impractical or impossible. A test of these two methods of plotting the infestation will be made by the Division of Forest Insect Investigations at the earliest possible date this fall. Film and aerial photographs have been ordered and the pilot and cooperating personnel alerted.

(4) The most favorable period for control is during the winter season when the activity of this insect practically ceases. During this dormant period which normally occurs from October to April, few to no new attacks would occur. If the infested trees could be located and treated or cut and salvaged during this period the outbreak should be checked. An important factor in favor of control now is that the number of infested trees is relatively small at the present time. Of the 32,000,000 board feet estimated killed, only 3,000,000 board feet may be considered to be infested at the present time and need treatment, since the treatment would be confined to only those trees currently attacked and carrying brood over the winter. Even though it may be impossible to log in this area during the winter months it should be possible to treat infested trees.

(5) The infested trees should be cut and logged in all areas where possible and the slabs from these logs burned. This should not be carried on in conjunction with a salvage operation, but should be a special project unless the operator is sure that he can cut over all of his areas of infestation, including both the killed and infested trees, within a short time. This period of time would be any time during the period October to April or within



any 30 - 40 day period during the summer. If an operator is unable to cut and burn the slabs of all infested trees in the period or periods described, he should locate, cut and spray all infested trees with the spray recommended by the Gulfport, Mississippi laboratory and salvage at a later date. Mr. Kowal, in a letter dated September 26, recommends the following spray: Using the 36% gamma product of benzene hexachloride (Penco 36) which costs 67¢ per pound (f.o.b. factory) the dilute solution is prepared by adding 2.33 pounds of the chemical to 50 gallons of fuel oil No. 2. With the cost of oil about 12¢ per gallon, the total cost per gallon of the spray will run about 16¢. Delay in treating infested trees by continuing salvage operations, rather than control, during the summer periods, except as stated above will not reduce the danger of the infestation continuing.

(6) That the Texas Forest Service, Texas Lumber Manufacturers Association, Texas National Forests, Southern Forest Experiment Station and interested timber owners be advised of decisions made in this matter, their cooperation solicited and reports furnished them whenever possible.

cc: Dr. MacAloney  
Texas Forest Service  
Texas Lumber Mfgs. Association  
Texas National Forests  
Southern Forest Experiment Station  
Regional Forester  
Kowal